CHAPTER 2
CRITICAL LIFTS

This chapter provides guidelines for critical-lift determination and requirements for planning and performing a critical lift safely and judiciously.

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2.1 CRITICAL-LIFT DETERMINATION

a. An appointed person shall classify each lift into one of the DOE categories (ordinary, critical, or preengineered production) prior to planning the lift.

b. A lift shall be designated as a critical lift if the requirements applicable for ordinary lifts do not adequately eliminate or control the likelihood or severity of the following:

1. Personnel injury or significant adverse health impact (onsite or offsite).

2. Significant release of radioactive or other hazardous material or other undesirable conditions.

3. Undetectable damage that would jeopardize future operations or the safety of a facility.

4. Damage that would result in delay to schedule or other significant program impact such as loss of vital data.

c. A lift should also be designated as critical if the load requires exceptional care in handling because of size, weight, close-tolerance installation, high susceptibility to damage, or other unusual factors.

2.2 CRITICAL-LIFT REQUIREMENTS

a. Ensure that the requirements are met for ordinary lifts specified in each section of this standard for each particular equipment category.

b. The operating organization shall appoint a Person-In-Charge (PIC) for the entire operation. This person shall meet the definitions of appointed, designated, and qualified as described in Chapter 1, "Terminology and Definitions," and shall be present at the lift site during the entire lifting operation.

c. The PIC shall ensure that a pre-job plan or procedure is prepared that defines the operation and includes the following:

1. Identification of the items to be moved, the weight, dimensions, and center of gravity of the load, and any hazardous or toxic materials that are present

2. Identification of operating equipment to be used by type and rated capacity

3. Rigging sketches that include (as applicable):

i. Identification and rated capacity of slings, lifting bars, rigging accessories, and below-the-hook lifting devices.

ii. Load-indicating devices.

iii. Load vectors.

iv. Lifting points.

v. Sling angles.

vi. Boom and swing angles.

vii. Methods of attachment.

viii. Crane orientations.

ix. Other factors affecting equipment capacity.

4. Operating procedures and special instructions to operators including rigging precautions and safety measures to be followed as applicable.

d. Experienced operators who have been trained and qualified to operate the specific equipment to be used shall be assigned to make the lift.

e. Only designated, qualified signalers shall give signals to the operator. *However, the operator shall obey a STOP signal at all times, no matter who gives the signal.*

f. The procedure and rigging sketches shall be reviewed and approved by the responsible manager (or designee) and the responsible oversight organization (such as safety, quality assurance, or quality control) before the lift is made.

g. A pre-lift meeting involving participating personnel shall be conducted prior to making a critical lift. The critical lift plan/procedure shall be reviewed and questions shall be resolved.

h. If required by the critical lift procedure, a practice lift shall be done before the critical lift. Conditions for a practice lift should closely simulate actual conditions involving: weight, rigging selection and configuration, load movement path, and other relevant factors. Practice lifts should be done by the same crew, using the same lifting equipment.

CHAPTER 3
PREENGINEERED PRODUCTION LIFTS

This chapter provides requirements for the design, evaluation, and performance of preengineered production lifts. This lift designation may be used at the discretion of the contractor for selected operations.

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3.1 GENERAL

a. A preengineered production lift is a repetitive, production-type lifting operation that is independent of the nature of the load to be lifted. Also, the probability of collision, upset, or dropping is reduced to a level acceptable to the responsible manager by preliminary operation evaluation, specialized lifting fixtures, detailed procedures, operation-specific training, and performance of independent review and approval of the entire process.

b. The preengineered production lift is a specialized lift performed by production personnel. The required procedures and controls ensure the safety of the operation and set this category of lift apart from traditional hoisting and rigging activities.

3.2 OPERATION EVALUATION

The following procedure should be used to determine if a lifting operation qualifies as a preengineered production lift.

3.2.1 Load Identification

a. Identify the identical items or group(s) of identical items to be repetitively lifted. Items must have the same dimensions, weight, and center of gravity to be considered identical.

b. Determine the dimensions, weight, center of gravity, and method of attachment of the items.

3.2.2 Task Determination

a. Determine the parameters of motion using the following as applicable:

1. Lifting, rotation, speeds, and travel directions.

2. Actions required with or adjacent to the load.

3. Other lifting operation details that affect safety and stability of the load.

3.2.3 Hazards Evaluation

Determine the consequences that could result from collision, upset, or dropping the load.

3.2.4 Equipment/Rigging Selection

a. Determine the type, class, and minimum capacity of lifting equipment (hoist, crane, forklift, etc.) required for the operation based on the identified load, task, and hazards.

b. Define the type of lifting fixtures required to safely accomplish the required task.

3.3 LIFTING FIXTURES

3.3.1 Design

a. Special lifting fixtures and rigging accessories shall be designed according to recognized consensus standards (29 CFR 1910, Occupational Safety and Health Standards for General Industry: 29 CFR 1926, Occupational Safety and Health Regulations for Construction; ASME B30.9, "Slings," B30.10, "Hooks," B30.20, "Below-the-Hook Lifting Devices"; etc.) and the lifting fixture design requirements in Chapters 12 and 14 ("Rigging Accessories" and "Below-the-Hook Lifting Devices," respectively).

b. The designer of special lifting fixtures shall be:

1. A member of a qualified engineering organization.

2. Qualified in machine design.

3. Knowledgeable of special lifting fixture design requirements.

c. The designer shall determine the requirements for initial and periodic inspections or tests, including acceptance/rejection criteria and periodic inspection/test intervals.

d. Special lifting fixture designs shall receive a documented review by another member of a qualified engineering organization and the responsible oversight organizations (safety, quality assurance, etc.).

e. Deviations in design that may result in design factors less than consensus standard requirements shall require documented justification and approval of the designer's manager and the manager of the responsible oversight organizations (safety, quality assurance, etc.).

f. Applications not specifically addressed in the ASME standards or in this standard may be approved by the responsible manager and oversight organizations (safety, quality assurance, etc.) when justification and documentation are provided and all other provisions of this section are met.

3.3.2 Fabrication

Special lifting fixtures shall be fabricated according to the specifications of the approved design package.

3.3.3 Inspection and Testing

a. Before initial use of each special lifting fixture, a qualified inspector shall perform a documented acceptance inspection and test on it. This process shall include:

1. Verification of configuration of the fixture against the design drawing specifications.

2. Nondestructive examination as specified in the approved design package.

3. Proof-testing as specified in the approved design package.

b. Personnel performing the lift shall visually inspect special lifting fixtures before use for visible signs of wear, deformation, deterioration, or damage. Records are not required.

c. A qualified inspector shall conduct periodic, documented inspections as required by the design organization. These inspections shall include preuse inspection requirements (visible signs of wear, deformation, deterioration, or damage) and a formal verification of the current configuration of the fixture against that specified in the approved design package.

d. Equipment to be used (cranes, hoists, forklifts, etc.) shall be inspected according to the appropriate section requirements in this standard for that type of equipment.

3.3.4 Storage, Maintenance, and Control

a. Lifting fixture users shall do the following:

1. Store special lifting fixtures in an appropriate location to prevent damage or deterioration.

2. Perform and document periodic preventive maintenance as required by the design organization.

3. Establish controls to ensure that special lifting fixtures are used only in the operations for which they were designed.

4. Maintain equipment to be used (cranes, hoists, forklifts, etc.) according to the appropriate section requirements in this standard for that type of equipment.

3.3.5 Modification and Repair

a. Modification to special lifting fixtures shall be designed, approved, and fabricated according to Sections 3.3.1 and 3.3.2 ("Design," and "Fabrication," respectively).

b. Following modification or repair of a load-bearing element of a special lifting fixture, the fixture shall be inspected and tested according to the initial use requirements in Section 3.3.3, "Inspection and Testing."

3.4 PROCEDURES

A detailed, approved, step-by-step procedure shall be developed for the entire operation.

3.4.1 Content

a. At a minimum, each procedure shall contain the following information:

1. Identification of the load to be lifted.

2. Identification of the specific lifting fixtures to be used in the operation.

3. Identification by class and capacity (if applicable) of the types of equipment to be used, such as cranes and hoists.

4. Verification that all equipment, fixtures, and accessories are operative, up-to-date on required periodic inspections and maintenance, and are in good condition before the operation begins.

5. Specific instructions for attachment of the lifting fixtures to the load and to the lifting equipment.

6. Parameters of motion required for the operation.

7. Specific instructions for removal of the lifting fixtures from both the load and the lifting equipment.

3.4.2 Development

a. The methods for developing new procedures, including standard procedure formats, should be clearly defined. Administrative procedures or writers guides should direct the development and review process for procedures at each site to ensure consistency at the site.

b. Qualifications for procedure writers shall be considered, including operating organization and experience.

c. Procedures should reference applicable source documents, such as facility design documents, safety analysis documents, vendor technical manuals, and industry standards.

d. Operating procedures should contain only one action per step.

e. Any necessary warnings, cautions, or notes should be easily identifiable and should not contain any action statements. These items should precede the step to which they apply and should appear on the same page as the step to which they apply.

f. The sequence of procedural steps should conform to the normal or expected operational sequence.

g. Procedures should be developed with consideration for the human-factor aspects of their intended use. For example, references to components should exactly match drawing and label-plate identifiers, and units should be the same as those marked on applicable instrumentation. Important factors should be highlighted, such as operating limits, warnings, and cautions.

3.4.3 Preparation and Revision

a. Appropriately trained personnel shall develop, review, and approve a step-by-step procedure for each lifting operation. The responsible oversight organizations (safety, quality assurance, etc.) shall participate in the review process.

b. Before its first use in the actual production process, the procedure shall undergo a formal verification and validation process using walk-throughs or similar methods to ensure that the steps are appropriate and correct. Any discrepancies found during this process shall be corrected and the process repeated until the procedure is correct.

c. Any changes to an existing, approved procedure shall be performed according to the process specified above. The change shall be evaluated to determine whether the revised procedure must be revalidated and reverified.

3.4.4 Approval

a. Before each procedure is validated, it shall be reviewed and approved by the following personnel:

1. Author of the procedure.

2. Representative of a qualified engineering organization.

3. Representatives of the responsible oversight organizations (e.g., safety, quality assurance).

b. After each procedure is validated, it shall be reviewed and approved by the following personnel:

1. Author of the procedure.

2. Representative of a qualified engineering organization.

3. Representatives of the responsible oversight organizations (i.e., safety, quality assurance).

4. Management of the facility where the procedure will be performed.

5. Management of the production organization performing the procedure.

c. Revisions of procedures shall receive the same depth of review and level of approval as the initial versions received.

All procedures, either new or revised, shall be approved before use.

3.4.5 Review

a. Approved procedures should be reviewed at periodic intervals to ensure that their information and instructions are technically accurate and that appropriate human-factor considerations have been included.

b. The frequency of reviews should be specified for each procedure; it may vary with the type and complexity of the activity involved.

c. Applicable procedures should be reviewed after an incident.

d. During each review, procedures should be compared to source documents to verify their accuracy.

3.4.6 Use

a. A copy of the current issue of the approved procedure shall be in the work area when the operation is performed.

b. Deviations from the approved procedure are not allowed during normal operations.

c. The requirements for use of procedures should be clearly defined and understood by all personnel.

d. If a procedure is determined to be deficient, a procedure change shall be initiated before operations continue.

e. Personnel performing the procedure may take whatever action is necessary during emergency conditions to return the process to a safe and stable condition without first initiating a procedure change.

3.5 DESIGNATED LEADER

a. Each time a preengineered production lift requiring more than one person is performed, a designated leader shall be present at the lift site during the entire operation.

b. Leadership designation may be by written instructions, specific verbal instruction for the particular job, or clearly defined responsibilities within the crew's organizational structure.

c. The designated leader's responsibility shall include the following:

1. Ensure that the personnel involved have received proper and current training and qualification for the procedure.

2. Ensure that the equipment and accessories specified in the procedure are available.

3. Survey the lift site for hazardous or unsafe conditions.

4. Ensure that equipment is properly set up and positioned.

5. Ensure that a signaler is assigned, if required, and identified to the equipment operator.

6. Direct the lifting operation to ensure that it is done safely and efficiently.

7. Stop the job when any potentially unsafe condition is recognized.

8. Direct emergency stabilization operations if an accident or injury occurs.

3.6 TRAINING

Specialized training shall be conducted for personnel involved in performing preengineered production lifts. This training shall be periodically reviewed and approved by the responsible operating and oversight organizations (safety, quality assurance, etc.).

3.6.1 Equipment Operation

a. Personnel shall be trained and qualified on the specific types of equipment required.

b. The equipment operation training shall include:

1. A demonstration by the individual of operational competence with the equipment.

2. A demonstration of appropriate safe operating practices.

3. Documented evidence of the individual's knowledge of safety-related information.

c. Equipment-operation training shall be repeated for personnel whenever a new or different type of equipment is introduced into the procedure.

3.6.2 Procedure

a. Personnel shall be trained and qualified in the proper execution of each specific procedure.

b. The procedure training shall include:

1. A demonstration by the individual of operational competence in performance of the procedure.

2. Documented evidence of the individual's knowledge of the steps and requirements of the procedure.

c. Training on a procedure shall be repeated periodically or when a modification to the procedure results in a significant change in the operation.

CHAPTER 4
LIFTING PERSONNEL

This chapter describes requirements for lifting personnel.

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4.1 GENERAL

This chapter specifies the operation, design, testing, and inspection requirements for the use of personnel lift platforms or baskets suspended from mobile or overhead cranes. This chapter implements the requirements of 29 CFR 1926.550(g) "Cranes and Derricks" and ASME B30.23, "Personnel Lifting Systems."

4.1.1 Personnel Lifting Evaluation

a. The use of a crane to hoist employees on a personnel lift platform is prohibited, except when the erection, use, and dismantling of conventional means of reaching the worksite, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, would be more hazardous or is not possible because of structural design or worksite conditions.

b. The manager specifically responsible for the overall work function to be performed shall determine that the erection, use, and dismantling of conventional means of reaching the work site (i.e., scaffold, ladder, stairway, aerial lift, or elevating work platform) would be more hazardous or is not possible because of structural design or worksite conditions.

c. For each personnel lifting procedure, the manager responsible for the task shall authorize the use of a crane-suspended work platform and attest to the need for the operation through a written justification attesting to that need. A statement describing the operation and its time frame shall be included. The statement, after being approved by the authorizer, shall be retained at the job site.

d. The manager specifically responsible for the overall work function shall not allow or require any operator to lift personnel under the following circumstances:

1. The operator does not feel physically or mentally fit to perform the operation.

2. The operator has been working for more 10 hours prior to the start of the lift or the lift will not be completed before the operator has been working for 12 hours.

3. The operator did not have at least eight hours off, immediately prior to the work shift containing the person.

4.1.2 Designated Leader

a. The Authorizing Manager shall appoint a Designated Leader for the entire personnel lifting operation.

b. The Designated Leader shall ensure that a pre-job plan is prepared that defines the operation. The Designated Leader shall ensure:

1. At each new job site prior to hoisting personnel, the personnel lift platform, rigging, and hook block shall be proof-tested by a qualified inspector to 125 percent of the personnel platform's rated capacity by holding it suspended for 5 minutes with the test load suitably distributed on the personnel platform.

2. After proof-testing, any deficiencies revealed by inspection, or by the proof test, be corrected and another proof-test conducted.

3. Any modification to the personnel lift platform or rigging requires retesting.

4. Test reports be kept on file and be readily available to appointed personnel.

5. A meeting, with the qualified operator, signaler, persons to be lifted, and the person responsible for overall worksite safety to plan is held prior to the trial lift to review the procedure.

6. The procedures for entering and leaving the personnel platform and the points at which persons will enter and leave the device be reviewed. This meeting shall be held at each new work location, and shall be repeated for any employees newly assigned to the operation.

c. The designated leader and the crane operator shall determine that:

1. The crane is uniformly level within 1 percent of level grade and firm footing exist under both crawler tracks or under each outrigger float. Cribbing mats under tracks or

blocks under outrigger floats are used as necessary to provide a firm and substantial footing.

2. Cranes equipped with outriggers have outriggers extended in accordance with the manufacturer's instructions.

3. Crane systems, controls, operator aids, and safety devices are activated and functioning properly.

4. No interferences exist.

5. The total weight of the loaded personnel lift platform (including personnel) and related rigging does not exceed 50 percent of the crane rating under the planned conditions of use.

6. The personnel lift platform is not loaded in excess of its rated load capacity.

7. The number of employees occupying the platform does not exceed the number required for the work being performed.

4.1.3 Trial Lift

a. Each shift, before personnel initially enter the personnel lift platform, the operator and signaler shall be conduct a trial lift. The trial lift shall include:

1. Loading the unoccupied personnel platform to at least the maximum anticipated load. Materials and tools to be used during the actual lift, if secured to prevent displacement, can be in the platform for the trial lift.

2. Making the trial lift from the location where personnel will enter the platform to each location where the platform will be hoisted and positioned. It is acceptable to perform a single trial lift on each shift for all locations to be reached from a single setup position.

b. The trial lift shall be repeated whenever:

1. The crane (mobile) is moved and set up in a new location or returned to a previously used location.

2. When the lift route is changed, unless the operator determines that the safety of the hoisted personnel is not affected.

3. If a different crane operator is assigned.

4.1.4 Lifting Operations

4.1.4.1 Pre-Lift Meeting

a. A meeting attended by the operator, the ground crew, signaler(s), person(s) to be lifted, and the designated leader shall be held each shift to plan and review procedures to be followed, including:

1. Points at which persons will enter and leave the platform.

2. Procedures for entering and leaving the platform.

3. Special precautions if personnel will perform work from the suspended platform.

b. This meeting shall be held at each new work location, and shall be repeated for any employees newly assigned to the operation.

4.1.4.2 Pre-Lift Inspection

a. After the trial lift, prior to lifting personnel:

1. A visual inspection of the crane, rigging, and personnel lift platform shall be conducted by a qualified inspector. Any defects found that create a safety hazard shall be corrected prior to hoisting personnel.

2. The platform shall be lifted a few inches and inspected to ensure that it is secure and properly balanced.

4.1.4.3 Lifting Personnel

a. Prior to hoisting personnel in a personnel lift patform ensure that:

1. No hazardous conditions exist with the platform and its associated rigging.

2. The hoist line is not wrapped around any part of the platform.

3. Hoist ropes are free of kinks.

4. Multiple-part lines are not twisted around each other.

5. The primary attachment is centered over the platform.

6. Ropes are properly seated on drums and sheaves.

7. The crane is with in 1 percent of level.

8. The crane has an anti two-block device installed and operational.

b. Employees being hoisted or working in a personnel lift platform shall:

1. Remain in continuous sight of, and in direct communication with, the operator or signaler. In situations where direct visual contact with the operator is not possible and the use of a signaler would create a hazard for that person, direct communication alone (such as a two-way radio) may be used.

2. Keep all parts of their bodies inside the suspended personnel lift platform during raising, lowering, and positioning to avoid pinch points.

3. Wear body harnesses with lanyards attached to the lower load block or overhaul ball, or to a structural member within the platform that is capable of supporting a fall impact.

4. Not stand on or work from the top rail, midrail, or toe board of the suspended personnel platform.

5. When working above water, the requirements of 29 CFR 1926.106 (Occupational Safety and Health Regulations for Construction) shall also apply.

6. When welding is being performed from the personnel lift platform, the electrode holders shall be protected from contact with metal components of the personnel platform.

c. Operators of cranes hoisting personnel in a personnel lift platform shall:

1. Before commencing or continuing the lift, consult with the designated leader when ever there is any doubt as to the safety of the lift.

2. Remain at the controls when the personnel lift platform is occupied.

3. Operate the crane so that lowering will be power-controlled (no free-fall).

4. Ensure movement of the personnel lift platform is performed in a slow, controlled, cautious manner with no sudden movements of the crane or the platform. The lifting or lowering speed shall not exceed 100 ft/min (30 m/min).

5. After the personnel lift platform is positioned, set all brakes and locks on the lift crane before personnel perform any work.

6. If the personnel lift platform cannot be landed, ensure it is tied to the structure before personnel get off or on.

7. Ensure that no lifts are made on another of the crane's load lines while personnel are suspended on the personnel lift platform.

d. Suspended personnel lift platforms shall be used only for personnel, their tools, and sufficient materials to do their work. They shall not be used for transporting bulk materials.

e. Personnel lift platforms should not be used in winds greater than 20mph (32.2 km/hr), electric storms, snow, ice, sleet, or other adverse weather conditions that could affect the safety of personnel.

f. Use tag lines to control motion of occupied personnel lift platforms unless their use creates an unsafe condition.

g. Cranes shall not travel while personnel are in the platform. Execptions to this provision shall be approved by the manager specifically responsible for the overall work function and precautions to be taken documented in the personnel lift plan.

4.2 MOBILE CRANES

Mobile cranes are designed and intended for handling materials, not personnel. In addition to the general requirements in Section 4.1, "General," the following requirements shall be met when lifting personnel with a mobile crane:

a. Personnel are permitted to ride only in one of the following:

1. A personnel lift platform that is supported from the crane's hook which meets the requirements of Section 4.4, "Personnel Platform."

2. A personnel basket attached directly to the boom which is approved by the crane manufacturer.

b. Cranes and derricks with variable-angle booms shall be equipped with a boom-angle indicator that is readily visible to the operator.

c. Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator, at all times, the boom's extended length, or an accurate determination of the load radius to be used during the lift shall be made prior to hoisting personnel.

d. A positive-acting device shall be used that prevents contact between the load block or overhaul ball and the boom tip (anti-two-blocking device), or a system shall be used that deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two-block damage-prevention feature).

e. Cranes having booms in which lowering is controlled by a brake without aid from other devices which slow the lowering speeds is prohibited.

f. Crane load lines shall be capable of supporting, without failure, at least seven times the maximum intended load, except where rotation resistant rope is used, the lines shall be capable of supporting without failure, at least ten times the maximum intended load.

g. Hydraulic cranes shall have check valves or other devices that will prevent uncontrolled movement in the event of system failure, engine failure, or hose rupture.

h. Cranes shall have a means to prevent retraction of hydraulically or pneumatically activated outriggers or stabilizers in the event a hydraulic or pneumatic line fails.

i. Pendant supported, jib type, boon extensions without positive stops are prohibited for personnel lifting.

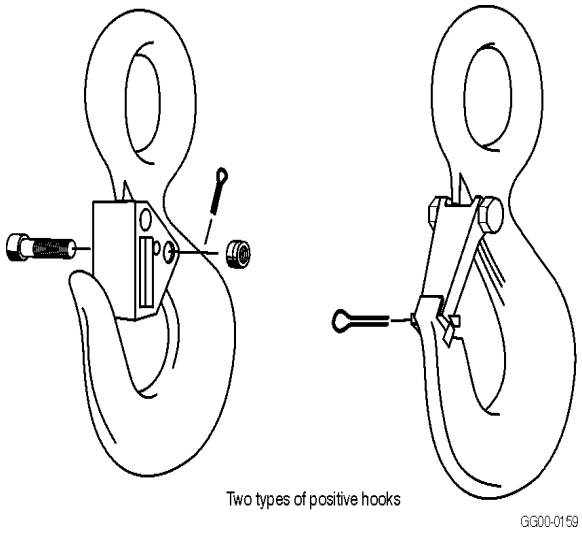

Figure. 4-1. Positive Hooks

j. Hooks on overhaul ball assemblies, lower load blocks, or other attachment assemblies shall be of the type that can be closed and locked, eliminating the hook throat opening. (See Figure 4-1). Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.

4.3 OVERHEAD CRANES

Overhead cranes are designed and intended for handling materials, not personnel. In addition to the general requirements in Section 4.1, "General" the following requirements shall be met when lifting personnel with an overhead crane.

a. Personnel are permitted to ride only in a personnel lift platform that is supported from the crane's hook which meets the requirements of Section 4.4.

b. A hoist-limit switch/device shall be provided in the hoisting direction to stop the hoisting motion to prevent two-blocking.

4.4 PERSONNEL LIFT PLATFORM

4.4.1 Platform Design and Construction

There is no attempt to comprehensively address platform design and construction in this chapter. Nevertheless, because many platform design and construction features can be observed and should be known by the platform user, (See Figure 4-2) the following key design and construction requirements are presented:

a. The personnel lift platform and suspension system shall be designed by a qualified person competent in structural design and familiar with national consensus standards governing personnel platform design.

b. All welding of the platform shall be performed by a qualified welder in accordance with ANSI/AWS D1.1. Where special steels or other materials are used, the manufacturer shall provide welding procedures. Welds shall be inspected by a qualified inspector

c. The personnel lift platform shall have:

1. A minimum design factor of five.

2. A plate specifying its empty weight and its rated load capacity or maximum intended load.

3. Perimeter protection consisting of a top rail approximately 45 in. (115 cm) high, a toe board at least 4 in. (10 cm) high, and a midrail approximately halfway between the top rail and the toe board.

4. A grab rail inside the personnel lift platform to minimize hand exposure.

5. Anchorage points within the platform for attaching personnel fall protection lanyards.

6. The sides of the platform enclosed from the toe board to the midrail with solid construction or expanded metal having openings no greater than ½ in. (1.27 cm).

7. Platform access gates, including sliding or folding types, if installed, shall have a positive acting device to restrain the gate from accidental opening. Swinging type access gates shall open only to the interior of the personnel lift platform.

8. Rough edges exposed to contact by employees surfaced (ground smooth) to prevent injury.

9. High-visibility color or marking for easy identification.

d. In addition to wearing hard hats, personnel shall be protected by overhead protection on the personnel lift platform when there is an overhead hazard. Sufficient headroom shall be provided to allow employees to stand upright in the platform.

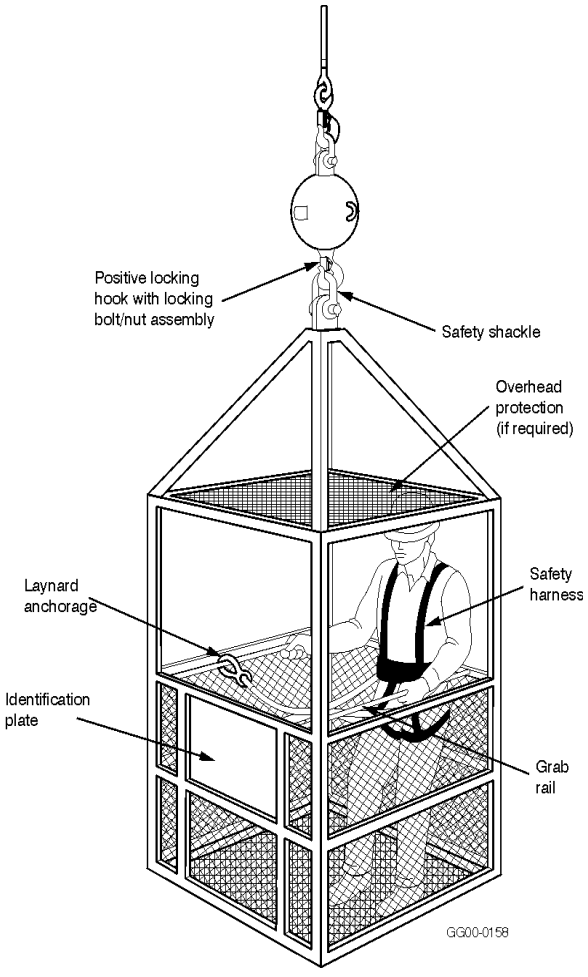

Figure. 4-2. Personnel Lift Platform

4.4.2 Platform Suspension System

a. Wire rope, shackles, rings, master links, and other rigging hardware must be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component and guided by the following:

1. One-leg system - design factor of seven.

2. Two or three-leg system - design factor of five for each leg.

3. Four-leg system - design factor of five with only three legs under stress.

4. Where rotation resistant rope is used, the slings shall be capable of supporting without failure at least ten times the maximum intended load.

b. Sling suspension systems shall utilize a master link or safety type shackle to connect the personnel lift platform to the load line to ensure that the load is evenly divided among the suspension system legs.

c. The suspension system shall be designed to minimize tipping of the platform due to movement of employees occupying the platform.

d. The sling suspension system attaching the personnel lift platform to the hoist line shall not be used for any other purpose when not hoisting personnel.

e. Shackles used in any part of the suspension system shall be a safety type (bolt-type shackle with nut and cotter pin).

f. All eyes in wire rope slings shall be fabricated with thimbles.

g. Wire rope clips, wedge sockets, or knots shall not be used in suspension system sling assemblies.

h. Synthetic webbing, natural or synthetic fiber rope shall not be used for the suspension systems.

i. Chain sling suspension systems shall use a minimum of grade 80 chain.

4.5 INSPECTIONS

All equipment used in the lifting of personnel shall be inspected, tested, and maintained to protect against failure during lifting operation.

4.5.1 Frequent Inspection

4.5.1.1 General

a. The platform manufacturer shall furnish complete inspection criteria for the platform users. The criteria shall address all inspection frequency classifications and shall cover:

1. The platform
2. Rigging components
3. Fasteners
4. All safety features and attachments.

4.5.1.2 Personnel Lift Platform

a. Prior to initial use and at each new job the platform shall be inspected by a qualified inspector in accordance with the instructions provided by the manufacturer.

b. The platform, suspension system, attachment points, and any motion controls shall be inspected at least each day, before use, by a designated person. The inspection is to identify conditions that have been specifically indicated by the platform manufacturer, or a qualified person, as potentially creating a hazardous operating condition. Visually inspect items such as the following:

1. Platform and suspension system markings to ensure all information is legible.
2. Platform structure:
   i. Load supporting members, welds and bolts.
   ii. Perimeter protection; top rail, midrail, toe board, and barrier form toe board to midrail.
   iii. Fall protection device anchorage points.
   iv. Gate locking mechanisms.
   v. Platform flooring.
   vi. Suspension attachment points.
3. Attachment mechanisms.
   i. Master links, shackles, slings, bolt-ups, etc.
4. Special purpose items:
   i. Overhead protection.
   ii. Platform controls

c. For frequent inspections, dated records for the hoisting equipment and personnel lift platform shall be made and kept by the platform user for the duration of the personnel lift operation.

4.5.2 Periodic Inspection

4.5.2.1 Personnel Lift Platform

a. At least once every 12 months, or as required by the personnel lift platform manufacturer, a periodic inspection of the platform shall be performed by a qualified inspector in accordance with the instructions provided by the manufacturer.

b. Platforms which have been out of service for 12 or more consecutive months shall receive a periodic inspection prior to use.

c. Dated inspections records for the platform shall be made. The last periodic inspection records shall be kept with the platform and available for review.

4.5.2.2 Hoisting Equipment

a. Hoisting equipment shall be inspected in accordance with requirements of Chapter 7, “Overhead & Gantry Cranes,” or Chapter 9, “Mobile Cranes.”

4.6 TESTING

4.6.1 Platform Manufacturer Test

a. The platform manufacturer shall perform the following testing:

1. Test the personnel lift platforms:

i. Suspension mechanisms or attachment components.

ii. Occupant safety features.

iii. Platform rating.

iv. When the complete production platform is not supplied by one manufacturer, the manufacturers platform test shall be conducted at final assembly by the platform assembler or a qualified inspector.

2. Slings (wire rope or chain) shall receive an initial load test before installation by applying a test load to each individual leg equal to twice the rated load of the leg. If a master link or safety shackle is used in the suspension system, it shall be tested to at least the weight of the platform plus the platform rating.

i. All tested components shall be visually inspected after testing.

ii. Any components showing damage shall be replaced and the test procedure repeated.

3. Non-destructive testing of the platform's suspension system attaching points.

4.6.2 Rated Load Test

a. At least annually and at each new job site, before personnel are hoisted, the personnel platform and suspension system shall be load-tested to 125 percent of the personnel platform's rated capacity.

b. The platform shall be held in a suspended position for 5 minutes with the load suitably distributed.

c. Load-testing may be done concurrently with the trial lift.

d. After load-testing, any deficiencies revealed during the inspection shall be corrected and another load test shall be conducted.

e. Structural repair or modification to the platform requires load-testing to 150 percent of the rated capacity.

f. When feasible, the hoisting equipment to be used for lifting personnel should be the equipment used to perform the load-test at the job site.

g. Dated test reports shall be kept on file and shall be readily available to appointed personnel.

4.6.3 Hoisting Equipment

a. Hoisting equipment shall be tested in accordance with requirements of Chapter 7, "Overhead & Gantry Cranes," or Chapter 9, "Mobile Cranes."

4.7 LIFTING PERSONNEL NEAR ELECTRICAL POWER LINES

4.7.1 General

a. When lifting personnel near electrical power lines, it is advisable to perform the lift so there is not possibility of the crane, load line, or personnel platform becoming a conductive path.

b. Cranes shall not lift personnel under electrical power lines if any combination of boom, personnel platform, load line, or machine components will enter the prohibited zone (See figure 4-3).

c. Lifting personnel near electrical power lines is not allowed unless there is no less hazardous way to perform the job. The following conditions must be considered when lifting personnel near electrical power lines:

4.7.2 Condition A

a. Power Lines are de-energized and grounded. (The safest and preferred condition). The following steps shall be taken when lifting personnel in Condition A:

1. The electrical utility organization shall de-energize the power lines.

2. As a minimum, the power lines shall be visible grounded to avoid the possibility of electrical feedback.

3. Before lifting personnel, a qualified representative from the electrical utility organization shall be on site to verify that the power lines are de-energized and grounded.

4. In addition to Electrical Hazard Warning Signs required on all mobile cranes, Electrical Hazard Warning Signs shall be posted inside the personnel lift platform.

5. Proximity warning devices, insulated links or boom cages, if used, shall not be a substitute for any requirements of this section.

4.7.3 Condition B

a. Power lines are energized with the equipment outside the prohibited zone but working within a fully extended boom length of the prohibited zone. Regardless of whether the crane boom will be fully extended, the fully extended boom length shall be considered (See figure 4-4). The following steps shall be taken when lifting personnel in Condition B:

1. A meeting, on the job site, between the Personnel Lift Authorizing Manager, the Designated Leader, and a qualified representative of the electrical utility organization shall take place. Procedures to safely complete the lift shall be established.

2. The clearance specified in Table 4-1 shall be considered.

3. Power line movements, horizontal and vertical, caused by wind shall be considered.

4. The required clearances to the power lines shall be continuously monitored by a signal person, also called a “wire watcher,” whose sole responsibility is to maintain proper clearance. The “wire watcher” shall be in constant communication with the crane operator.

5. Tag lines to the personnel platform, when used, shall be of a nonconductive type, such as dry rope made of polypropylene or polyethylene fiber.

6. No person outside the platform or crane cab shall be permitted to touch the crane, load line or platform unless the “wire watcher” indicates it is safe.

7. Operation of the boom or the platform over power lines should be avoided. Poor perception of distance and multiple potential contact points make this very hazardous.

8. Consider attaching ribbons, balls, or other visibility enhancing devices, to the power line to aid in visually locating the prohibited zone.

9. In addition to Electrical Hazard Warning Signs required on all mobile cranes, Electrical Hazard Warning Signs shall be posted inside the personnel lift platform.

10. Proximity warning devices, insulated links or boom cages, if used, shall not be a substitute for any requirements of this section.

4.7.4 Condition C

a. Power lines are energized with the equipment inside the prohibited zone (See Table 4-1). **Lifting personnel in this condition is strictly prohibited.**

Table 4-1. Safe working distance from power lines.

a. When operating near high-voltage power lines:	
Normal voltage (phase to phase)	**Minimum required clearance**
to 50 kV	**10 ft (3.1 m)**
Over 50 to 200 kV	**15 ft (4.6 m)**
Over 200 to 350 kV	**20 ft (6.1 m)**
Over 350 to 500 kV	**25 ft (7.6 m)**
Over 500 to 750 kV	**35 ft (10.7 m)**
Over 750 to 1000 kV	**45 ft (13.7 m)**

b. While in transit with no load and boom or mast lowered:	
Normal voltage (phase to phase)	**Minimum required clearance**
to 0.75 kV	**4 ft (1.2 m)**
Over 0.75 to 50 kV	**6 ft (1.3 m)**
Over 50 to 345 kV	**10 ft (3.5 m)**
Over 345 to 700 kV	**16 ft (4.9 m)**
Over 750 to 1000 kV	**20 ft (6.1 m)**

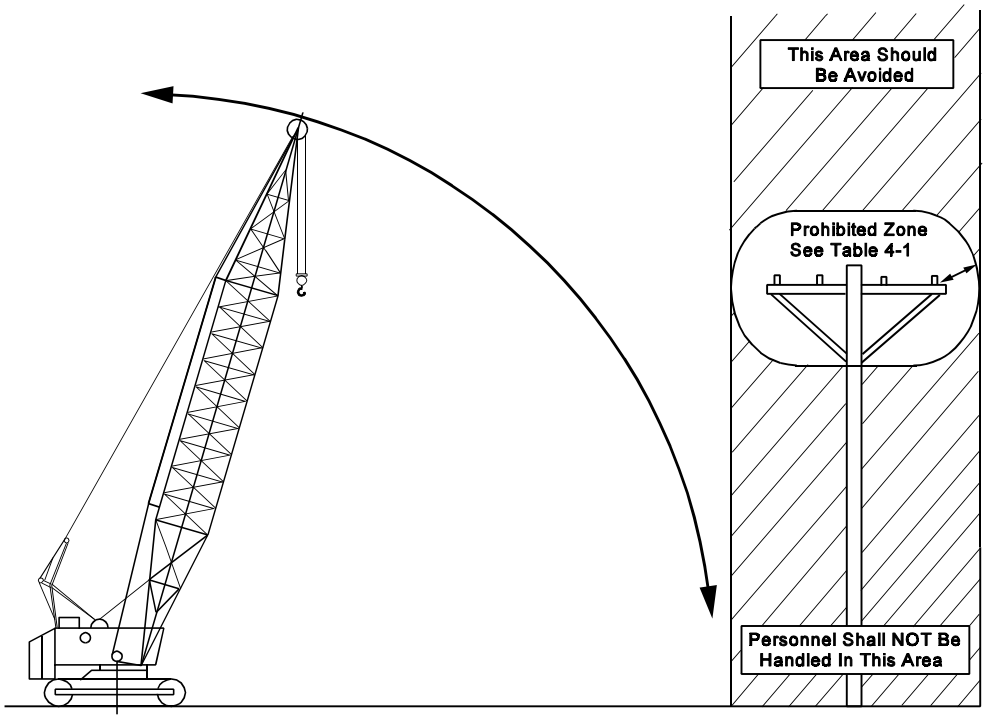

Figure 4-3 Danger Zone for Cranes and Lifting Personnel Near Electrical Transmission Line

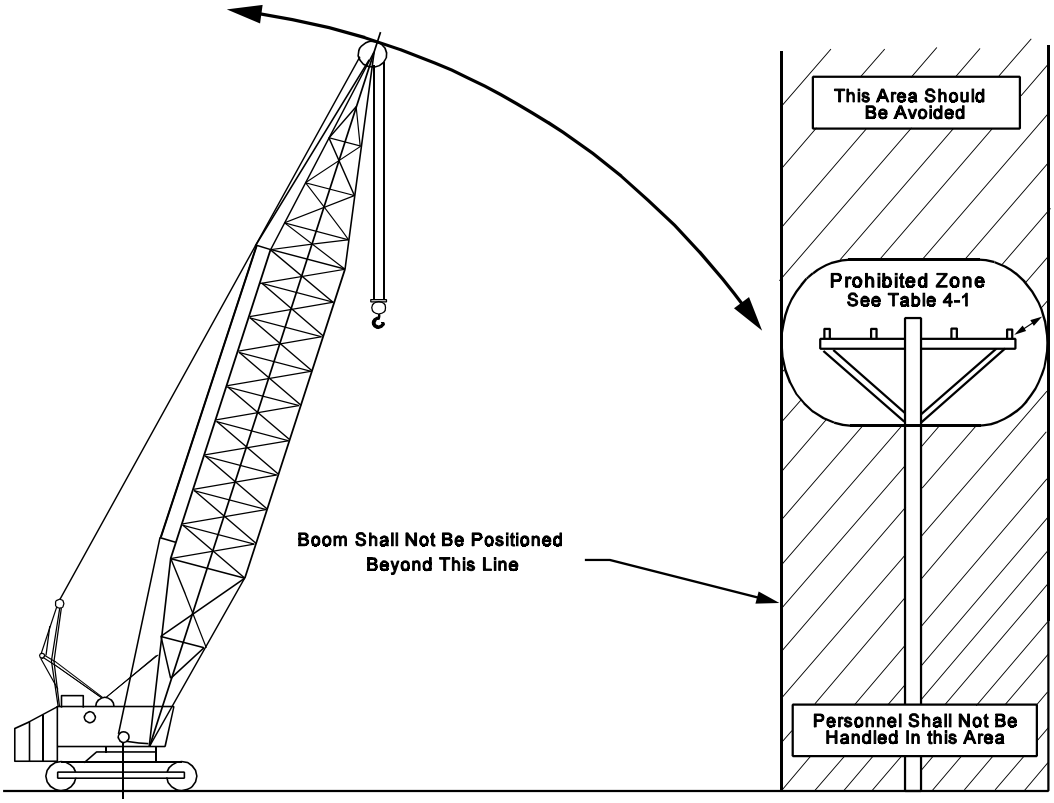

Figure 4-4. Danger Zone For Cranes Lifting Personnel Near Electrical Transmission Lines.

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EXHIBIT I
(SAMPLE FORM ONLY)

PERSONNEL LIFT PLATFORM PRE-LIFT INSPECTION

Inspector: _____ Date: _____

Platform Identification Number: _____

1. Trial Lift Completed with anticipated lift weight: _____ (lbs. or kg)

2. Markings:	Satisfactory	Unsatisfactory
Platform (All Information Legible)	( )	( )
Suspension System	( )	( )
3. Structure		
Load Supporting Welds/Bolts	( )	( )
Load Supporting Members	( )	( )
Barrier From Toe Board to Intermediate Rail	( )	( )
Hand Rail	( )	( )
Fall Protection Device Anchorage Points	( )	( )
Gate Locking Mechanisms	( )	( )
Platform Flooring	( )	( )
Suspension Attachment Points	( )	( )
4. Attachment Mechanisms		
Pins/Ears/Bolt-Up's/eyes (circle)	( )	( )
Wire Rope/Chains/Rigid Leg (circle)	( )	( )
Master Links	( )	( )
5. Special Purpose Items (i.e., Overhead Protection, Floatation, Platform Controls)		
List: 1) _____	( )	( )
2) _____	( )	( )
3) _____	( )	( )

6. General Comments: _____

Designated Leader Signature: _____ Date: _____

EXHIBIT II
(SAMPLE FORM ONLY)

PERSONNEL LIFTING PLANNING AND AUTHORIZATION FORM

1. Location: _____ Date: _____

2. Purpose of Lift: _____
3. Hoisting Equipment Manufacturer: _____
   Model Number: _____
   Serial Number: _____
4. Expected Radius: _____ (Maximum)
   _____ (At Work Location)
5. (A) Rated Load at Radius: _____
   (B) Maximum Lifted Load (50% of 5A):
6. (A) Platform Identification: _____
   (B) Platform Rating: _____
7. Platform Weight: _____
8. (A) Number of Platform Occupants: _____
   (B) Approximate Weight (with equipment): _____
9. Total Lift Weight: _____ [(7 + 8B)(No more than 5B above)]
10. Personnel Lift Supervisor: _____
11. What are the alternatives to this personnel lift? _____
12. Why are they not being used? _____
13. Pre-Lift Briefing Held: ____/____/____ Time: _____ AM/PM
    Attendees: _____
14. Anticipated Hazards (wind, weather, visibility, power lines): _____
15. Lift Accomplished Date: ____/____/____ Time: _____ AM/PM
16. Remarks: _____

Designated Leader Signature: _____ Date: _____